What is claimed is:

1. An apparatus for measuring the impact behavior of golf club heads comprising an impact testing apparatus, including a rigid frame, an instrumented shaft secured in a cantilevered manner to said frame, and a universal golf club head mounting apparatus to receive a club head thereon;

deflection sensing means adjacent said instrumented shaft for sensing a deflection of said respective shaft and emitting a voltage signal indicative of a sensed deflection;

a processing unit connected to said deflection sensing means to receive voltage signals there from and to calculate shaft deflections corresponding thereto;

acceleration sensing means adjacent said instrumented shaft for sensing an acceleration of said respective shaft and emitting a voltage signal indicative of a sensed acceleration;

a processing unit connected to said acceleration sensing means to receive voltage signals there from and to calculate shaft accelerations corresponding thereto.

2. An apparatus as set forth in claim 1 wherein the rigid frame includes a vertical tube by which an impacting object can be aimed and guided to impart a magnitude and location variable impacting force on said golf club head.

3. An apparatus as set forth in claim 1 wherein each deflection sensing means includes a pair of strain gauges, said gauges being disposed on opposite sides of said instrumented shaft and arranged such that they measure bending and torsional temperature insensitive deflection thereof.

4. An apparatus as set forth in claim 1 wherein each acceleration sensing means includes a triad of accelerometers, said accelerometers being disposed on said instrumented shaft such that they measure linear and angular accelerations thereof.

5. An apparatus as set forth in claim 1 wherein the processing unit includes an electronic triggering device to initiate data collection for said deflection sensing means and said acceleration sensing means.

6. An apparatus as set forth in claim 1 which further comprises a monitor connected to said processing unit for graphically displaying said shaft deflections per unit of time in absolute or nondimensional deflection units.

7. An apparatus as set forth in claim 1 which further comprises a monitor connected to said processing unit for graphically displaying said shaft accelerations per unit of time in absolute or nondimensional acceleration units.

8. A method for evaluating and comparing golf club heads based upon mass properties comprising the steps of

creating a graphical model of a golf club head,

determining the mass, three linear coordinates of the mass center location, and the six elements of the inertia tensor,

determining the principal inertia values and principal inertia orientations from said six elements of the inertia tensor,

configuring a solid ellipsoid such that it has the same said mass and same said principal inertia values as the golf club head,

creating a graphical model of said solid ellipsoid,

superimposing said graphical model of the solid ellipsoid over said graphical model of the golf club head such that the solid ellipsoid and the golf club head have coincident mass center locations and principal inertia orientations,

generating multiple graphical views of said superimposed image,

providing simultaneous graphical images of various golf club heads with respective superimposed solid ellipsoid so to compare the relative size, shape, and orientation of respective solid ellipsoids.

9. In a system for evaluating and comparing golf club head designs based upon mass properties and impact behavior, the combination of

a rigid frame, an instrumented shaft secured in a cantilevered manner to said frame, a universal golf club head mounting apparatus to receive a club head thereon, a deflection sensing means adjacent said instrumented shaft for sensing a deflection of said respective shaft and emitting a voltage signal indicative of a sensed deflection, a processing unit connected to said deflection sensing means to receive voltage signals there from and to calculate shaft deflections corresponding thereto, an acceleration sensing means adjacent said instrumented shaft for sensing an acceleration of said respective shaft and emitting a voltage signal indicative of a sensed acceleration, a processing unit connected to said acceleration sensing means to receive voltage signals there from and to calculate shaft accelerations corresponding thereto, a vertical tube by which an impacting object can be aimed and guided to impart a magnitude and location variable impacting force on said golf club head, an electronic triggering device to initiate data collection for said deflection sensing means and said acceleration sensing means, a monitor connected to said processing unit for graphically displaying said shaft deflections

per unit of time in absolute or nondimensional deflection units, a monitor connected to said processing unit or graphically displaying said shaft accelerations per unit of time in absolute or nondimensional force units,

a method comprising the steps of creating a graphical model of a golf club head, determining the mass, three linear coordinates of the mass center location, and the six elements of the inertia tensor, determining the principal inertia values and principal inertia orientations from said six elements of the inertia tensor, configuring a solid ellipsoid such that it has the same said mass and same said principal inertia values as the golf club head, creating a graphical model of said solid ellipsoid, superimposing said graphical model of the solid ellipsoid over said graphical model of the golf club head such that the solid ellipsoid and the golf club head have coincident mass center locations and principal inertia orientations, generating multiple graphical views of said superimposed image, providing simultaneous graphical images of various golf club heads with respective superimposed solid ellipsoid so to compare the relative size, shape, and orientation of respective solid ellipsoids.